

CLAIMS

We claim:

1. ~~A method for ranking cross-tabs comprising the steps of:~~
- a. creating at least two cross-tabs;

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- 3 b. computing a deviance for each cell of each cross-tab using formula (1):

$$d(i_1, \dots, i_d) = \frac{(n(i_1, \dots, i_d) - e(i_1, \dots, i_d))}{\sqrt{e(i_1, \dots, i_d)}} \quad (1)$$

where:

$n(i_1, \dots, i_d)$ is the actual value of the cell at location (i_1, \dots, i_d) ;

$s_k(i_k) = \sum_{j=1}^{D_k} n(i_1, \dots, i_j, \dots, i_d)$ is the sum of all cell values
along the kth dimension;

$S = \sum_{j_1=1}^{D_1} \dots \sum_{j_k=1}^{D_k} \dots \sum_{j_d=1}^{D_d} n(j_1, \dots, j_d)$ is the total sum of all cell values
in the cross - tab;

$e(i_1, \dots, i_d) = \frac{\prod_{j=1}^d s_j(i_j)}{S^{d-1}}$ is the estimated value for
the cell at location (i_1, \dots, i_d) ;

d is the dimension of the cross - tab; and

D_k is the number of cells in the kth dimension; and

4 c. ranking the deviances; and

5 d. selecting the cross-tabs containing the cell having a deviance, the absolute value
6 thereof being greater than a desired value.
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1 2. The method of claim 1, further comprising the step of:

2 filtering or qualifying the cross-tabs based on sparsity where sparsity is the number of cells
3 that do not or cannot have a value.

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1 3. The method of claim 1, further comprising the step of:
2 filtering cross-tabs k , where k is an integer having a value less than or equal to the
3 dimension of the cross-tab.

1 4. The method of claim 1, further comprising the step of:
2 limiting the number of cross-tabs displayed.

1 5. A method comprising the steps of :

- 2 a. selecting n variables from a multidimensional dataset, where n is an integer less than
3 or equal to the dimensionality of the dataset;
4 b. selecting a cross-tab dimension, m , where m is an integer having a value less than
5 or equal to n or having a range of values between a lower limit greater than to equal
6 to 1 and an upper limit less than or equal to n ;
7 c. constructing k cross-tabs of dimension m , where k is the number of combinational
8 cross-tabs derived from n variable taken m at a time; and
9 d. do ranking;
10 e. displaying a list of the ranked cells with cross-tab identification information;
11 f. selecting a desired cell from the list;
12 g. display the corresponding cross-tab with highlight cell.

1 6. The method of claim 5, wherein list manipulation to display top x positive and negatives with
2 middle hidden.

1 7. A graphics windowing routine comprising:
2 a window including a pane and a drop down box associated with the pane designed to allow
3 selection between different pane display formats for the pane.

1 8. The routine of claim 7, further comprising at least two pane, pane splitters separating the
2 panes and a drop down box associated with each pane designed to allow selection between different
3 pane display formats for each pane.

1 9. A GUI comprising:

- 2 a. a polyscope graphics routine; and
3 b. a hierarchical value-based graphics routine
4 c. a polystar graphics routine;
5 d. a tree graphics routine;
6 e. cross-tab pixel graphics routine; and
7 f. surface routine.

1 10. A method comprising the steps of:

- 2 a. generating a decision tree from a dependent cross-tab having a dimension m , where
3 m is an integer having a value less than n where n equal to the total number of
4 variable in a dataset and where the remaining variable are independent variables;
5 b. searching the decision tree for dependent cross-tabs having corresponding relative
6 cell values significantly different from the cell values in the root cross-tab to produce
7 at least one interesting cross-tab; and
8 c. converting each interesting cross-tab into a corresponding filtered dependent cross-
9 tab where the filter represents the decision tree path leading to each interesting cross-
10 tab.

1 11. The method of claim 10, further comprising the step of:

2 display the decision tree as a hierarchical graphic or tree graphic;

1 12. The composition of claim 10, further comprising the step of:

2 selecting a node, and

3 highlighting the dependent cross-tab in a cross-tab decision tree or changing the data in the
4 single dependent cross-tab to correspond to the data in the selected node.

1 13. A method for constructing a decision tree comprising the steps of:

2 selecting m dependent variables from a set of n variables, where n and m are integers and

1 m has a value less than n and the remaining n-m variable are independent variables;
2 converting the m dependent variables into a single hybrid variable;
3 display the hybrid variable as a dependent variable cross-tab; and
4 classifying the hybrid variable relative to the independent variables using a decision tree
5 classifier to form a decision tree of dependent variable cross-tabs.

1 14. The method of claim 13, further comprising the step of:
2 selecting a node of the decision tree; and
3 performing cross-tab operations, where the cross-tab operations include at least one of the
4 graphics routines of the GUI of claim x.

1 15. The method of claim 13, further comprising the step of:
2 analyzing each cross-tab to generate cross-tab data.

1 16. The method of claim 13, further comprising the step of:
2 displaying the cross-tab data in a hierarchical graphics routine.

1 17. The method of claim 13, further comprising the step of:
2 constructing an equivalent cross-tab representation of the decision tree, where the cross-tab
3 representation comprises a plurality of dependent variable cross-tabs where the plurality is equal to
4 a product of a dimension of each independent variable where data in each dependent variable cross-
5 tab derives from the intersecting independent variables.

1 18. A method for discovering and ranking "Interesting" relationships in an N-dimensional data
2 cube, the method comprising the steps of:
3 enabling a Discovery Process to find all N-Dimensional Cross-tabs in a data cube and on discovery
4 of an N-Dimensional Cross-tab, calculate an Interest Factor for each Cross-tab Cell included in said
5 Cross-tab where the Interest Factor denotes a measure of statistical significance between the Cross-
6 tab Cell and all other Cross-tab member Cells and where an N-Dimensional Cross-tab Query String
7 that references said Cross-tab Cell and it's member Cells is inserted into a Ranked List where said

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1 Ranked List is sorted relative to said Cross-tab Cell's Interest Factor.

1 19. A method for discovering and ranking "correlated" relationships in an N-dimensional data
2 cube, the method comprising the steps of:
3 identifying a Dependant Cross-tab (consisting of two or more dimensions and a measure) and
4 enabling a Pivot Tree Discovery Process wherein an Enhanced Decision Tree Algorithm will
5 evaluate all remaining dimension members (those that do not make up the Dependant Cross-tab)
6 with respect to the said Dependant Cross-tab and to generate an Enhanced Decision Tree Output
7 Data based on the strength of correlation to the said Dependant Cross-tab.

1 20. A method for visualizing a Decision Tree, the method comprising the steps of: 345/419
2 reading the Decision Tree Output Data from a Decision Tree algorithm and visually displaying a
3 Decision Tree using a concentric ring structure where the center ring (or circle) represents the root
4 node and each subsequent node split (tree level) is represented as an additional annular ring
5 extending away from the root node.

1 21. A method for visualizing a Decision Tree, the method comprising the steps of:
2 reading the Decision Tree Output Data from a Decision Tree algorithm and visually displaying said
3 Decision Tree Output Data using a Decision Tree Scatter Plot wherein the node-dept (level) is
4 represented on the X-axis and the number of records are represented on the Y-axis (preferably a
5 logarithmic scale).

1 22. An interface to a MDD, comprising a query receiver, a results sender, a query parser, a clause
2 translator, a command sender, a data receiver and an operational construct assembler, where both
3 sender and receiver can be combined into an exchanger and the parser and translator can be
4 combined into a disassembler. 707/26
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TRANSLATOR
SENDER & RX

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MAY NOT USE ABBREVIATION
w/o defining